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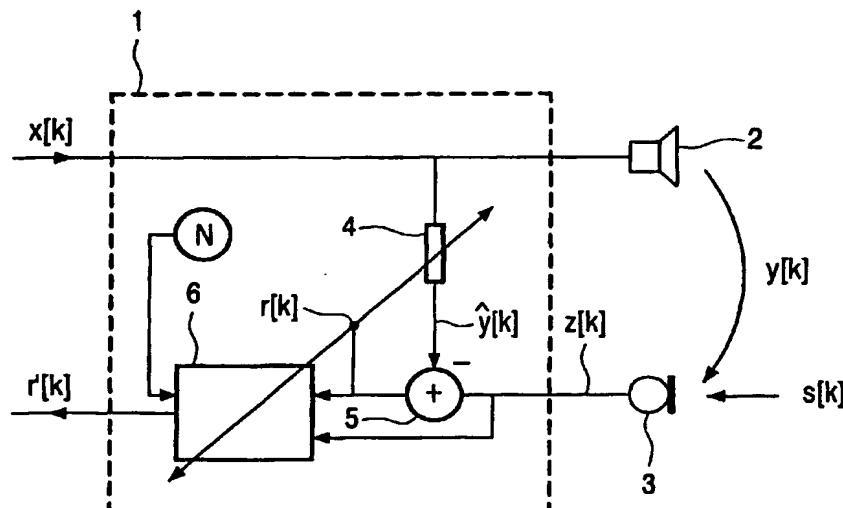
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(54) Title: NON STATIONARY ECHO CANCELLER



(57) Abstract: An echo canceller (1) is described, which has dedicated non stationary echo cancelling properties. The non stationary echo could be estimated directly, or indirectly by subtracting the stationary echo determined by a stationary noise estimator. The echo canceller may comprise an adaptive filter (4) and a residual echo processor (6) coupled to the adaptive filter, which residual echo processor is equipped with the non stationary echo canceller. Such a non stationary echo canceller is proposed in order to prevent the stationary component in the echo estimate, especially in the residual echo from continuously distorting near end speech. This improves echo canceller performance in terms of speech quality and speech intelligibility, which is particularly important in cases of single talk near end speech, as opposed to double talk.

WO 2004/002127 A1

**WO 2004/002127 A1**



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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## INTERNATIONAL SEARCH REPORT

 Internati Application No  
 PCT/25 03/02275

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GUSTAFSSON S ET AL: "Combined acoustic echo control and noise reduction for hands-free telephony" SIGNAL PROCESSING. EUROPEAN JOURNAL DEVOTED TO THE METHODS AND APPLICATIONS OF SIGNAL PROCESSING, ELSEVIER SCIENCE PUBLISHERS B.V. AMSTERDAM, NL, vol. 64, no. 1, 1998, pages 21-32, XP004108821 ISSN: 0165-1684 the whole document	3-9
A	WO 01 33814 A (TELLABS OPERATIONS INC) 10 May 2001 (2001-05-10) figure 5 page 8, line 21 -page 15, line 6 page 1, line 18 -page 3, line 5	1-9
A	WO 97 45995 A (PHILIPS ELECTRONICS NV ;PHILIPS NORDEN AB (SE)) 4 December 1997 (1997-12-04) cited in the application abstract figures 1,5 page 4, line 9 -page 10, line 14	1-9
A	KALLINGER, MARKUS; KAMMEYER, KARL-DIRK;BITZER, JOERG: "RESIDUAL ECHO ESTIMATION WITH THE HELP OF MINIMUM STATISTICS" PROCEEDINGS OF THE 3RD IEEE BENELUX SIGNAL PROCESSING SYMPOSIUM (SPS-2002), 21 - 22 March 2002, pages 1-4, XP002255179 LEUVEN, BELGIUM the whole document	1-9
A	BOLL S F: "Suppression of acoustic noise in speech using spectral subtraction" IEEE TRANSACTIONS ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING, APRIL 1979, USA, vol. ASSP-27, no. 2, pages 113-120, XP002255180 ISSN: 0096-3518 the whole document	3-9

## INTERNATIONAL SEARCH REPORT

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0223755	A	21-03-2002	AU 9095701 A	26-03-2002
			DE 10196631 T0	10-07-2003
			EP 1317845 A2	11-06-2003
			GB 2381698 A	07-05-2003
			WO 0223755 A2	21-03-2002
WO 0133814	A	10-05-2001	AU 1359601 A	14-05-2001
			CA 2390200 A1	10-05-2001
			WO 0133814 A1	10-05-2001
			US 2003053618 A1	20-03-2003
			US 2003091182 A1	15-05-2003
			US 6526139 B1	25-02-2003
			US 6522746 B1	18-02-2003
			US 6526140 B1	25-02-2003
WO 9745995	A	04-12-1997	BR 9702254 A	17-02-1999
			CN 1198283 A	04-11-1998
			EP 0843934 A1	27-05-1998
			WO 9745995 A1	04-12-1997
			JP 11510673 T	14-09-1999
			US 2002159585 A1	31-10-2002